Paper Code U127-103(RE-E/FF)

* Model Solution with marking scheme *

Course Name :- Basic mechanical Engg. Course code :- ME$12173

Q.1

a) Detail classification of metal Joining process → 2 marks
Diagram of metal arc welding → 2 marks
Explanation of metal arc welding process → 2 marks
[Total = 6 marks]

Q.1

b) Enlist all Drilling machine operations → 2 Marks
Explain any two operations in detail → 4 marks
[Total = 6 marks]

Q.1

c) Diagram of Lathe machine → 3 marks
correct lebelling → 1 mark
[Total = 04]

Q.2

a) Definition of forging → 1 mark
List all forging operations → 1 mark
Explanation of any 2 faging operations → 4 marks
[Total = 6 marks]

Q.2

b) Short Introduction of any six sheet metal operations with diagram → 6 marks

Q. 2

c) Explaination of sand casting process with diagram → 4 marks

Q.3

a) Diagram of Babcock & wilcox boiler → 3 marks
Explaination of working procedure → 3 marks.
[Total = 6]

Q. 3

b) Diagram of 4-stroke S.I. Engine → 2 marks & Explanation → 2 marks
[Total = 4 marks]

Q.3

c) Any 8- Differentiating point ⟶ [4 marks]

Q.4

a) Diagram of 4-stroke S.I. engine ⟶ 2 marks

Working of " ⟶ 4 marks

[Total = 6]

Q.4

b) Schematic diagram of single stage Reciprocating compressor ⟶ 2 marks

Explanation of working procedure ⟶ 2 marks

[Total = 4 marks]

Q.4

c) Definition of 1 TR of Refrigeration ⟶ 1 mark

1 TR = 210 kJ/min } ⟶ 1 mark

1 TR = 3.5 kW

Definition of COP & its mathematical Relation ⟶ 2 marks

[Total = 4 marks]

Q.5

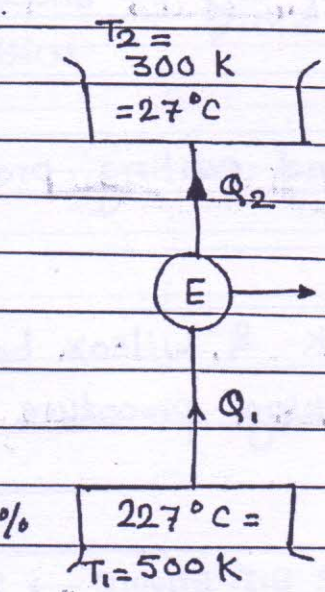
1) ANS. → b (40%) [2 marks]

$$\eta = \frac{O/P}{I/P} = \frac{W}{Q_1}$$

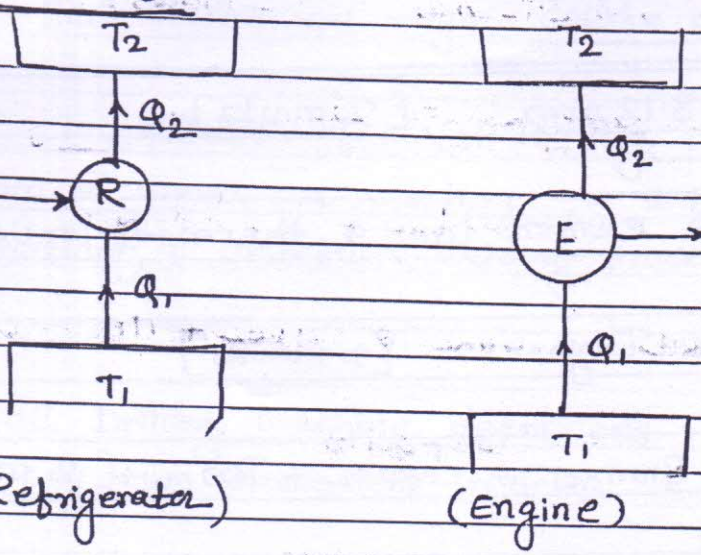
$$= \frac{Q_1 - Q_2}{Q_1}$$

$$= \frac{T_1 - T_2}{T_1}$$

$$= \frac{500 - 300}{500} \times 100 = 40\%$$



2. ANS. → C (2) [2 marks]



for engine,

$$\eta = \frac{W}{Q_1} = 0.5 \quad \therefore \quad W = 0.5\,Q_1 \quad \text{—— (1)}$$

For Refrigerator, (having same Temp. limits)

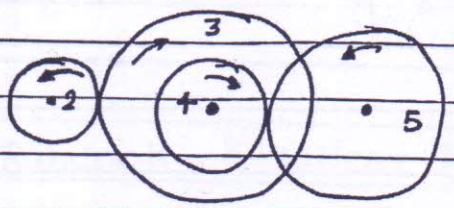
$$COP = \frac{Q_1}{W}$$

from eqn (1), $W = 0.5\,Q_1$

$$\therefore COP = \frac{Q_1}{0.5\,Q_1} = \frac{10}{5} = 2 \longrightarrow \text{ANS (C)}$$

3. Ans → (b) only gear '4' [2 marks]

4. ANS → (a) 300 rpm [2 marks]



$N_2 = 1200$ rpm
$T_2 = 20$
$T_3 = 40$
$T_4 = 15$
$T_5 = 30$

$N_3 = N_4$ → mounted on same shaft

$$\therefore \frac{N_3}{N_2} = \frac{T_2}{T_3}$$

$$\therefore N_3 = 1200 \times \frac{20}{40} = 600 \text{ rpm}$$

$$\therefore \frac{N_5}{N_4} = \frac{T_4}{T_5}$$

$$\therefore N_5 = 600 \times \frac{15}{30} = 300 \text{ rpm}$$

Q.5 → ANS (a) ⇒ 8.12 mm [2 marks]

Q.6 → ANS (a) ⇒ Zeroth Law of thermodynamics [2 marks]

Q.7 → ANS (d) ⇒ Toughness [2 marks]

Q.8 → ANS (d) ⇒ Bronze ⇒ copper + Tin [2 marks]

Q.9 → Ans (d) → composite

Q10. → ANS (C) → Shaft & hub

Q.11 → ANS (C) → 0.15 %

Q.12 → ANS (C) → constant.

By
Prof. Pawale K. T.
D.Y.P.I.E.M.R., Akurdi,
Pune - 411044.

25/04/2018.